

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2005/011599

International filing date (day/month/year)
07.04.2005

Priority date (day/month/year)
08.04.2004

International Patent Classification (IPC) or both national classification and IPC
B29C43/08, B29C43/42

Applicant
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1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Written Opinion

2 MONTH REMINDER	<u>12/14/05</u>
1 MONTH REMINDER	<u>1/14/06</u>
2 WEEK REMINDER	<u>1/28/06</u>
3 DAY REMINDER	<u>2/1/06</u>
ACTION DUE AND DATE	<u>2/14/06</u>

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2005/011599

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2005/011599

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
- ☒ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☐ not paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☒ all parts.
 - ☐ the parts relating to claims Nos.

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	28-31,41-68,85-89,
	No: Claims	1,69,16,81,90,32,73
Inventive step (IS)	Yes: Claims	28-31,41-68,85-89,
	No: Claims	2-15,17-27,33-40,70-72,74-80,82-84,92,93,
Industrial applicability (IA)	Yes: Claims	1-93
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item IV.

1. This Authority considers that there are 8 inventions covered by the claims indicated as follows:
I : Claims 1-15,69-72
II: Claims 16-27,81-84
III: Claims 28-31,90-93
IV: Claims 32-40
V: Claims 41-47
VI: Claims 48-58,85-89
VII: Claims 59-68
VIII: Claims 73-80
2. The reasons for which the inventions are not so linked to form a single general inventive concept, as required by Rules 13.1, 13.2 and 13.3, PCT are as follows:
3. The prior art has been identified as EP-A-1 273 417 and discloses a method and apparatus for compression molding plastic articles, wherein:
 - a first actuator 34 is carried by a base and includes a core or male mold section,
 - a second actuator 56 includes a female mold section,
 - a slide shaft 24 with bearings 26,28,30,54 is provided for reciprocating the 2 actuators to define a mold cavity.
4. Thus, all features which are common to each of the inventions as defined in the independent claims are known from EP-A-1 273 417, such that these features cannot be considered to be special technical features.
 - 4.1. Invention I:
The technical features relating to the provision of a rail and block for reciprocating the 2 actuators of claims 1-15,69-72 make a contribution over this prior art. The objective problem to be solved by these features can be construed as to reduce wear of the apparatus.
 - 4.2. Invention II:

The technical features relating to a mold section comprising at least two sections common to claims 16-27 (apparatus claims) and 81-84 (method claims) make a contribution over this prior art. The objective problem to be solved can be construed as to facilitate removal of the molded article.

4.3. Invention III:

The technical features relating to coupler means or a bracket common to claims 28-31, 90-93 make a contribution over this prior art. The objective problem to be solved can be construed as to avoid damaging the cam plates and rollers due to undue forces exerted upon the actuators.

4.4. Invention IV:

The technical features relating to biasing means of claims 32-40 make a contribution over this prior art. The objective problem to be solved can be construed as to maintain a desired compression force during cooling of the article in the mold cavity.

4.5. Invention V:

The technical features relating to coolant supply passage of claims 41-47 make a contribution over this prior art. The objective problem to be solved can be construed as the cooling of the core of a compression molding apparatus.

4.6 Invention VI:

The technical features relating to locking means common to claims 48-58 (apparatus claims) and 85--89 (method claims) make a contribution over this prior art. The objective problem to be solved can be construed as proper locking of the mold cavity.

4.7 Invention VII:

The technical features relating to at least two radially spaced first and second mold sections of the first and second actuators of claims 59-68 make a contribution over this prior art. The objective problem to be solved can be construed as simultaneous molding of plastic articles.

4.8 Invention VIII:

The technical features relating to sleeve means of the female mold of claims 73-80 make a contribution over this prior art. The objective problem to be solved can be construed as to ensure alignment of the female and male mold sections.

5. The above analysis shows that the problems and special technical features of invention I and inventions II to VIII are different, such that the different special features cannot be considered as corresponding technical features.

Re Item V.

The following documents (D) are referred to in this report:

D1 EP-A-0 280 190
D2 US-A-6 416 312
D3 FR-A-1 324 471
D4 EP-A-1 273 471
D5 US-A-5 670 100
D6 US-A-5 225 132

The following comments concerning Novelty and Inventive Step have been made in view of the clarity objections made in Item VIII below. The claims have been interpreted under the clarity assumptions made in Item VIII below.

Invention I (Claims 1-15,69-72)

Claim 1

1. From D1 (see column 6, line 6 to column 9, line 52 and figures) there is known (applying the wording of claim 1) an apparatus for compression moulding a plastic article, comprising:
- a) a base 10
 - b) a first actuator A/B carried by the base and including a core (see fig 9)
 - c) a second actuator C-F carried by the base and including a female mould section defining a portion of a mould cavity in which the plastic article is formed, said core

being at least partially received in said female mould section (see fig. 9),
d) at least one linear bearing 20,28 associated with at least one of the first actuator and second actuator for linear reciprocation relative to the base 10,
f) each linear bearing including a rail 20 carried by the base and a block 28 slidably received on the rail 20 carried by the first and second actuator.

2. Thus, it appears that the apparatus of claim 1 is not new as required by Article 33(2) PCT.
3. The alternative solution of the rail being carried by the first or second actuator instead of the base does not seem to be of inventive relevance.

Independent Method Claim 69

4. The additional features of providing a cam plate seems also to be known from D1 (see fig. 3). Thus, the same objections as raised against claim 1 apply accordingly.

Dependent Claims 2-15,70-72

5. The features of these claims do not seem to be of inventive relevance as they relate to details known from the prior art or seem to be conventional to a person skilled in the art.

Invention II (Claims 16-27,81-84)

Claim 16

1. From D2 (see column 5, line 10 to column 7, line 25 and figures) there is known (applying the wording of claim 1) an apparatus for compression moulding a plastic article, comprising:
 - a) a base (implicitly; see column 6, line 29: "rotary molding apparatus")
 - b) a first actuator 22 carried by the base (implicit) and including a male mould section 125 (see fig 6) and a first female mould section 80 formed in at least two sections 116,118 (see fig 7) disposed adjacent to at least a portion of the male mould section 125 (see fig. 6),

- c) a second actuator 26 carried by the base (implicitly) and including a second female mould section 36, said male mould section 125 being at least partially received in said female mould section 36 so that said first female mould section 80, said male mould section 125 and said second female mould section 36 define a mould cavity 128 in which said plastic article is formed,
- d) a first cam assembly 40,50,52,106,104,102 associated with said first female mould section 80 to drive said at least two sections 116,118 toward each other to a closed position and away from each other to an open position (see column 4, lines 61 to 67: "separating the female mold part 80 into two parts"), and
- e) a second cam assembly 34,38,43 associated with said first female mould section 80 to reciprocate said at least two sections 116,118 in a second direction from said first direction (see column 4, lines 12 to 16: "... pin 34 ... activated ... to vertically reciprocate the housing 20 ..."), said second cam assembly capable of operating independently of the first cam assembly (see column 4, lines 61 to 67: "...move outwardly...").
6. D3 also discloses an apparatus comprising most of the relevant features a) to e) outlined above.
7. Thus, it appears that the apparatus of claim 16 is not new as required by Article 33(2) PCT.

Independent Method Claim 81

8. The same objections as raised against claim 16 apply accordingly.

Dependent Claims 17-27,82-84

9. The features of these claims do not seem to be of inventive relevance as they relate to details known from the prior art or seem to be conventional to a person skilled in the art.

Invention III (Claims 28-31,90-93)

Claim 28

10. From D4 (see column 4, line 23 to column 6, line 26 and figures) there is known an apparatus for compression moulding a plastic article including
 - a) a base
 - b) an first actuator 34 carried by the base and including a mould section assembly, and
 - c) a cam follower 38 to move the first actuator.D5 also discloses the features a) to c) outlined above.
11. Claim 28 differs from this prior art in that a releasable coupler is provided, the releasable coupler being constructed and arranged to release forces according to the features of claim 28.
12. This features provides the effect of the avoiding damages of the moulding apparatus.
12. This construction is neither known in the art nor can it be rendered obvious to a skilled person by the apparatus known from D4 even in combination with the constructions known from the prior art.
13. Thus the subject matter of claim 28 meets the requirements of novelty and inventive step to Articles 33(2) and 33(3) PCT.
14. Dependent claims 29 to 31 define further advantageous and non-obvious variations of the apparatus according to claim 28 and thus equally meet the requirements of novelty and inventive step to Articles 33(2), 33(3) PCT.

Method Claims 90 to 93

15. The relevant features concerning the releasable coupler according to the features disclosed in claim 28 are missing. Thus, claims 90 to 93 do not meet the requirements of novelty and inventive step to Articles 33(2), 33(3) PCT.

Invention IV (Claims 32-40)

Claim 32

16. Claim 32 discloses a mold tooling assembly mainly comprising a biasing member acting against a mould section. However, such biasing members are known in the art (see for example D5, "springs 53,59").
17. Thus, it appears that the apparatus of claim 16 is not new as required by Article 33(2) PCT.

Dependent Claims 33 to 40

18. The features of these claims do not seem to be of inventive relevance as they relate to details known from the prior art or seem to be conventional to a person skilled in the art.

Invention V (Claims 41-47)

Claim 41

19. The invention relates to a mould core assembly for a compression moulding apparatus comprising a cooling supply system according to features of claim 41. A mould core assembly comprising a cooling supply system is disclosed from D2 (see fig 6).
20. In order to improve cooling efficiency an inner tube 72 having a central passage 70 and disposed in an inner sleeve 78 so to define a fluid passage 86 is provided according to the features of claim 41.
21. This construction is neither known in the art nor can it be rendered obvious to a skilled person by the devices known from the constructions of the prior art.
22. Thus, claim 41 meets the requirements of novelty and inventive step according to Articles 33(2) and 33(3) PCT.

Dependent Claims 42 to 47

23. Dependent claims 42 to 47 define further advantageous and non-obvious variations of the apparatus according to claim 28 and thus equally meet the requirements of novelty and inventive step to Articles 33(2), 33(3) PCT.

Invention VI (Claims 48-58,85-89)

Claim 48

24. The invention relates to an apparatus for compression moulding comprising a first and a second actuator 16,20 and a locking mechanism according to features of claim 41. Apparatuses comprising locking mechanisms are known in the art, see for example D4, D6.
25. In order to improve alignment the apparatus of the invention is provided with a locking rod 224 arranged to be locked in a bore 232 by a slide bar 238 as disclosed in claim 48.
26. This construction is neither known in the art nor can it be rendered obvious to a skilled person by the devices known from the constructions of the prior art.
27. Thus, claim 48 meets the requirements of novelty and inventive step according to Articles 33(2) and 33(3) PCT.

Independent Method Claim 85

28. Method claim 85 is formulated accordingly and thus equally meets the requirements of novelty and inventive step according to Articles 33(2) and 33(3) PCT.

Dependent Claims 42 to 47, 86 to 89

29. Dependent claims 49 to 58 and 86 to 89 define further advantageous and non-obvious variations of the apparatus according to claim 48 or the method according to claim 85 and thus equally meet the requirements of novelty and inventive step to Articles 33(2), 33(3) PCT.

Invention VII (Claims 59-68)

Claim 59

30. The invention relates to an apparatus for compression moulding a plastic article comprising
- a) a base 12 carrying tooling pairs 14,
 - b) the pairs 14 comprising
 - c) a first actuator 16 having radially spaced first mould sections 18, 92 and
 - c) a second actuator 20 having radially spaced second mould sections 22 and
 - d) a cam mechanism for driving the mould sections
- as disclosed in claim 59. Apparatuses comprising cam mechanisms are known, see D1, D2.
31. In order to improve alignment and avoid wear resistance the apparatus of the invention is provided with a group of cam paths 270, 172, 274, 284, 284 disposed in a cam plate 266 to drive the radially spaced first mould sections as disclosed in claim 59.
32. This construction is neither known in the art nor can it be rendered obvious to a skilled person by the devices known from the constructions of the prior art.

33. Thus, claim 59 meets the requirements of novelty and inventive step according to Articles 33(2) and 33(3) PCT.

Dependent Claims 60 to 68

34. Dependent claims 49 to 58 and 86 to 89 define further advantageous and non-obvious variations of the apparatus according to claim 59 and thus equally meet the requirements of novelty and inventive step to Articles 33(2), 33(3) PCT.

Invention VIII (Claims 73-80)

Claim 73

35. Claim 73 relates to a mould tooling assembly mainly comprising a mold section slidably received in a sleeve 192 disposed in a main body 154 having a chamber 176. However, such sleeves are known in the art, see D5, figures 9,16.
36. Thus, it appears that the apparatus of claim 73 is not new as required by Article 33(2) PCT.

Dependent Claims 74 to 80

37. The features of these claims do not seem to be of inventive relevance as they relate to details known from the prior art or seem to be conventional to a person skilled in the art.

Industrial Applicability

38. The subject-matter of claims 1 to 93 is able to work, can be manufactured, and is thus looked upon as being industrially applicable.

Re Item VII.

1. The claims are not drafted in the two-part form as required by Rule 6.3 PCT.
2. Reference numerals are not added after the technical features of the claims (rule 6.2 PCT).
3. The description is not consistent with the claims (see Rule 5.1(a) (ii), (iii) PCT). Documents D1 to D6 reflecting the most relevant prior art, are not cited by number followed by a brief summary of the relevant contents.

Item VIII

Claim 16

1. According to the requirements of clarity of Article 6 PCT all of the essential features needed to define the invention should be specified in an independent claim in such a way that a person skilled in the art would have no difficulty in arriving at the subject-matter or method according to the claim.
2. Claim 16 of the present application does not meet this requirement of Article 6 as relevant features concerning the driving of the actuators, as defined for example in claim 17, are missing. Without these features, the claimed compressing of plastic articles cannot be achieved.
3. Claim 16 of the present application does not meet the requirement of Article 6 as the feature "said second cam assembly capable of operating independently of the first cam assembly". According to the description, the first cam assembly comprising parts 110,122,126,128 drives the thread splits 92 radially whereas the "second cam assembly" comprises parts 130,142,144,128 and

drives the thread splits 92 axially (see page 10, second paragraph to page 11, first paragraph). Reciprocating inner rod 128 constitutes part of both assemblies. Thus, it is not clear to the skilled person, how the independent movement could be achieved.

4. Claim 16 of the present application does not meet the requirement of Article 6 as the features "first cam assembly" and "second cam assembly" are not clearly defined. It seems that these assemblies drive the thread splits 92. However, the term "cam assembly" is being used in the description for both: the thread splits 92 and the actuators 16,20 (see "cam assembly 260", "cam assembly 262").
5. On page 9, second paragraph, there is disclosed that each mould core section 18 includes two neck ring sections 92. Contrary to this, claim 16 discloses that the two neck ring sections or thread splits 92 (i.e. the first female mould section) are part of the first actuator 16 and not of the male mould section, i.e. core mould 18.

Claim 28

6. Claim 28 of the present application does not meet the requirement of clarity of Article 6 and is thus not allowable as relevant features to define the invention are missing. In order to achieve moulding of a plastic articles as claimed, features concerning a second actuator comprising a counter mould section to create a mould cavity seem to be essential.
7. In claim 28 the term "the first actuator" is not defined. The term "a releasable coupler" is not clear.
8. Claim 28 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not defined. The features concerning the releasable coupler being "constructed and arranged to release when ..." attempt to define the subject-matter in terms of the result to be achieved. Structural features to define the subject-matter in more concrete terms, viz. in

terms of how the effect is to be achieved, are missing.

Claim 32

9. Claim 32 of the present application does not meet the requirement of clarity of Article 6 and is thus not allowable as relevant features to define the invention are missing. In order to achieve moulding of a plastic articles as claimed, features concerning a second actuator comprising a counter mould section to create a mould cavity seem to be essential.

Claim 41

10. Claim 41 of the present application does not meet the requirement of clarity of Article 6 and is thus not allowable as relevant features to define the invention are missing. In order to achieve moulding of a plastic articles as claimed, features concerning a second actuator comprising a counter mould section to create a mould cavity seem to be essential.

Claim 59

11. Claim 59 of the present application does not meet the requirement of clarity of Article 6 and is thus not allowable as the terms "first mold sections" and "first" and "second cam follower" are not clearly defined.
12. According to the description, the first actuator 16 comprises a plurality of male mold sections 18 and neck ring sections 92 whereas second actuator is comprising female mould sections 22. First actuator 16 is being moved against second actuator 20 by first upper follower 38 engaging cam 40. Moving away first and second actuators 16,20 is being performed by second upper follower 42 engaging cam 46 (see description, pages 6,7).
13. Thus, contrary to the disclosure in claim 59, that "a first cam follower ...associated with one first mold section" and "a second cam follower ...associated with the other first mold section", it seems that both cam

followers 38,42 are acting on the actuator 16 as a whole unit. Only thread splits 92 are being independently moved by cam paths 284,286 engaging first and second followers 130,142.

Claim 73

14. Claim 73 of the present application does not meet the requirement of clarity of Article 6 and is thus not allowable as relevant features to define the invention are missing. Providing only a "mold section defining a part of a mold cavity" is not sufficient to mould plastic articles as claimed.

Terminology

15. According to the requirements of Rule 10.2 PCT, the terminology and the signs shall be consistent throughout the application. This requirement is not met in view of the use of the expressions below:
- "first actuator 16" (page 6) = "upper actuator 16" (page 6)
 - "male mold section 18" (page 6, claim 16) = "mold core 18" = "core 18" (page 8) = "first mold section" (claim 59)
 - "mold core assembly 60" (page 8) = "mold section" (claim 32) = "mold section assembly" (claim 28) = "a first mold section" (claim 48) = "mold tooling" (claim 59)
 - "a second female mold section" (claim 16) = "a female mold section 22" (page 6)
 - "neck ring sections or thread splits 92" (page 9) = "a first female mold section" (claim 16)
 - "rail 50" = "rail 50a" = "rail 50b" = "leading rail 50a" (page 7) = "rail" (claim 1)
 - "a first cam assembly" = "a second cam assembly" (claim 16)
 - "an upper cam assembly" = "a first cam assembly" (claim 16)
 - "locking rod 224" = "locking rod 226" = "key 226"
 - "annular chamber 86" (page 8) = "coolant chamber" (claim 41) = "fluid passage" (claim 41)
 - "bore 70" (page 8) = "central passage" (claim 41)
 - "inlet 76" (page 8) = "coolant supply passage" (claim 41)

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

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"gap 82" (page 8) = "coolant return passage" (claim 41)
"main body 30" (page 6) = "a first main body" (claim 48)
"main body 154" (page 11) = "a second main body" (claim 48)
"central bore 232" (page 14) "a bore" (claim 48)
"first and second upper followers 38,42" (page 7) = "a first" and "a second cam follower" (claim 59)
"a cam 40" (page 7) = "a cam path" (claim 59)
"a second thread split follower 142" (page 11) = "a second cam follower" (claim 59)
"cam truck 126" (page 10) = "cam path" (claim 59)
"second actuator 20" (page 11) = "mold tooling assembly" (claim 73)
"main body 30" (page 6) = "main body 154" (page 12)

Further Points

16. The first sentence of last paragraph on page 1 does not see to be complete.
17. Ref. "222" is not depicted in the drawings.